

Abstract Submitted  
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**Polarimetric measurement of the motion of trapped atoms around a nanofiber**<sup>1</sup> F. K. FATEMI, Army Research Laboratory, P. SOLANO, L. A. OROZCO, S. L. ROLSTON, JQI, UMD Dept. of Physics, and NIST — Polarimetry is an important tool for probing the classical and quantum dynamics of a collection of trapped atoms. We observe the birefringence induced by trapped Rb atoms around an optical nanofiber by measuring the polarization change of an off-resonant probe. The signal from the weak, non-destructive probe is amplified using heterodyne detection. We observe the dynamical response of the trapped atoms to a transient modification of the trapping potential. This provides a direct measurement of the trapping frequencies associated with the axial and transverse potentials. The presence of large longitudinal fields in the evanescent field of the fiber complicates polarimetry, presenting significant challenges for the observation of atomic spin dynamics through Faraday rotation measurements.

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